4.7 NOISE

This section presents a brief discussion of the generation and characteristics of sound and how sound is measured, followed by a characterization of the existing ambient sound levels in the project area and identification of sensitive receptors. Applicable regulations of the local community are also discussed.

The operation of the Long Wharf produces both mobile and stationary source noise emissions. Mobile source noise emissions are associated with the operation of ships and tugs/barges that call on the terminal. Stationary source noise is associated with terminal operations at the Long Wharf and include the noise associated with ships while hoteling, the various pumps, and operation of the vapor recovery system. The impacts analysis compares these operations to the local regulations to determine whether continued operation of the terminal would exceed established noise criteria.

4.7.1 Environmental Setting

Characteristics of Sound

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale (a logarithmic loudness scale) is used to quantify sound intensity in a convenient and manageable manner. Because the human ear is not equally sensitive to all frequencies within the entire spectrum, noise measurements are weighted more heavily within those frequencies of maximum human sensitivity in a process called "A-weighting," written as dBA. In accordance with published literature, the human ear can detect changes in sound levels of approximately 3 dBA under normal ambient conditions. Changes of 1 through 3 dBA are noticeable to some people under quiet conditions, while changes of less than 1 dBA are only discernable by few people under controlled, extremely quiet conditions. A change of 5 dBA is readily discernable to most people in an exterior environment.

Noise may be generated from a point source, such as a piece of construction equipment, or from a line source, such as a road with moving vehicles. Because the area of the sound wave increases as the sound gets farther and farther from the source, less energy strikes any given point over the surface area of the wave. This phenomenon is known as "spreading loss." Because of spreading losses, noise attenuates (decreases) with distance. The typical atmospheric spreading loss rate for point source noise is 6 dBA per doubling of the distance.

A line source will also attenuate with distance, but the rate of attenuation is a function of both distance and, due to reflection and absorption, the type of terrain over which the noise passes. Over hard sites, such as developed areas with paving, noise attenuates

at a rate of 3 dBA per doubling of the distance. Over soft sites, such as undeveloped areas, open space, and vegetated areas, noise attenuates at a rate of 4.5 dBA per doubling of the distance.

These represent the extremes and most line source noise is produced in areas which will actually contain a combination of both hard and soft elements, with the noise attenuation placed somewhere in between these two attenuation factors. The only way to actually determine the absolute amount of attenuation that an area provides is through field measurement under operating conditions with simultaneous noise level measurements conducted at varying distances from a constant noise source.

Objects that block the line-of-sight attenuate the noise source if the receptor is located within the "shadow" of the blockage (such as behind a sound wall). If a receptor is located behind the wall, but has a view of the source, the wall will do little to attenuate the noise. Additionally, a receptor located on the same side of the wall as the noise source may experience an increase in the perceived noise level because the wall can reflect noise back to the receptor, compounding its effect.

Time variation in noise exposure is typically expressed in terms of the average energy over time (called Leq), or alternatively, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L50 noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L08 represents the noise level that is exceeded 8 percent of the time or 5 minutes per hour. These "L" values are typically used to demonstrate compliance for stationary noise sources with the City's Noise Ordinance as discussed below. Other values typically noted during a noise survey at the Lmin and Lmax. These values represent the minimum and maximum root-mean-square noise levels obtained over a period of 1 second.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, State law requires that, for planning purposes, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or the day/night average noise level (Ldn). The CNEL descriptor requires that an artificial increment of 5 dBA be added to the actual noise level for the hours from 7:00 through 10:00 p.m. and 10 dBA for the hours from 10:00 p.m. through 7:00 a.m. The Ldn descriptor uses the same methodology, except that there is no artificial increment added to the hours between 7:00 through 10:00 p.m. Both descriptors give roughly the same 24-hour level, with the CNEL being only slightly more restrictive (i.e., higher). In some cases, such as with the city of Richmond, the Noise Ordinance does not specifically call out a CNEL, but instead sets restrictions on maximum noise by the time of day. For example, the Richmond Noise Ordinance specifies that within single-family residential areas, noise cannot exceed 60 dBA for a period of 30 minutes in any hour between the hours of 7:00 a.m. through 10:00 p.m., and 50 dBA between the hours of 10:00 p.m. through 7:00 a.m. This would then equate to an Ldn of 60 dBA.

Noise Characteristics of the Project Area

Proximate Noise Levels

To determine proximate sensitive land uses and ambient noise levels, a field study was conducted on July 12, 13, and 14, 1998, on the Long Wharf and adjacent to the project area. Noise monitoring was conducted using a Quest Technologies Model 2900 Type 2 Integrating/logging Sound Level Meter. The unit meets the American National Standards Institute Standard S1.4-1983 for Type 2, International Electrotechnical Commission Standard 651 – 1979 for Type 2, and International Electrotechnical Commission Standard 651 – 1979 for Type 2 sound level meters. The unit was field calibrated each day using a Quest Technologies QC-10 calibrator prior to the readings. The accuracy of the calibrator is maintained through a program established through the manufacturer and is traceable to the National Bureau of Standards. The calibration unit meets the requirements of the American National Standards Institute Standard S1.4-1984 and the International Electrotechnical Commission Standard 942: 1988 for Class 1 equipment.

Noise monitoring included five measurements at the nearest residential location and two on the Long Wharf obtained during unloading operations. Measurement locations are depicted in Figure 4.7-1. All obtained noise level measurements are included in Table 4.7-1.

NR-1 – This reading was taken at the high tide line on the beach in back of the dwelling located at 875 Ocean. This dwelling represents the nearest residence to the Long Wharf and is immediately northeast of the project area. A 15-minute reading was obtained beginning at 10:21 a.m. Three ships were observed at the Terminal during the measurement. Ambient noise included the "lapping" of the waves on the beach, wind noise from a light breeze, a slight hum from Long Wharf-related electrical equipment, and the hum of offshore operations, most likely related to offshore dredging noted in the Bay. One commercial jet aircraft overflight was also noted.

Conversation with the resident noted that this is the typical noise level observed during facility operations. However, the resident also noted that on occasion, during some night operations, some of the ships' generators produce a distinctive "roar" similar to that produced by a jet engine. Conversation with Chevron personnel noted that the referenced "roar" is in all probability that produced from some of the ships onboard generators, and that these ships are neither owned nor operated by Chevron, thus noise control could be difficult to enforce.

NR-2 – This reading was obtained at the same location at the water's edge, to document night operations (and try to capture the "roar"). The reading was taken from 10:30 through 10:46 p.m. The lapping of the waves and wind gusts were continuous and were the most noticeable noise sources. Two commercial jet aircraft overflights were also noted. Even though the three ships were still at berth, no noise was perceived as emanating from Terminal operations. It is again noted that this location (NR-1 and NR-2) is the closest residence to the Long Wharf.

Figure 4.7-1 – Location of Noise Measurement Sites (Was 3.10-1)

Table 4.7-1
Onsite and Proximate Noise Level Measurements[1]

Noise Level Location	Date	Leq (dBA)	Lmin (dBA)	Lmax (dBA)	L08 (dBA)	L50 (dBA)
NR-1	7/12/98	52.2	48.0	67.2	51.8	50.0
NR-2	7/12/98	62.0	58.3	65.8	63.4	63.4
NR-3	7/12/98	50.8	44.6	64.4	53.7	43.2
NR-4	7/13/98	64.0	60.3	67.3	65.5	63.9
NR-5	7/13/98	64.4	59.8	68.9	66.0	64.2
NR-6	7/14/98	70.8	67.9	73.0	71.8	70.9
NR-7[2]	7/14/98	66-68				

[1] **The Leq represents the equivalent sound level and is the numeric value of a constant level that over the given period of time transmits the same amount of acoustic energy as the actual time-varying sound level. The Lmin and Lmax represent the minimum and maximum root-mean-square noise levels obtained over a period of 1 second. L08 and L50 represent the noise levels that are exceeded 8 and 50 percent of the time or 5 and 30 minutes per hour.**

[2] **See text.**

NR-3 – In an effort to measure the ambient noise without the sound of the waves, this reading was taken at the corner of Ocean and Western in front of the house noted above. A 15-minute reading was obtained beginning at 10:30 p.m. During this period an automobile pulled up at a distance of about 40 feet. The departing operator closed the car door and opened and closed the trunk. Additionally, local residents were engaged in conversation about 40 feet from the meter. Other noise included the leaves rustling in the trees and one light aircraft and five commercial jet overflights.

NR-4 – This reading was taken in the same location as NR-1. A 15-minute reading was obtained beginning at 12:38 p.m. Three ships including the "Overseas Washington," the "Formosa Ten," and the "Pride Venture" were observed at the Terminal during the measurement. During the reading, the "Overseas Washington" was being towed out of the Terminal by a tugboat. Again, the dominant noise was that from the lapping of the waves on the beach.

NR-5 – This reading was taken in the same location and almost immediately subsequent to NR-4. The "Overseas Washington" was observed to start its engines and a 10-minute reading was obtained beginning at 1:00 p.m. As the engines started, a faint momentary rumble was noted in the background noise. The "Formosa Ten" and the "Pride Venture" were still observed at the Terminal. While the dominant noise was that from the lapping of the waves on the beach, a helicopter overflight was also noted.

NR-6 – This reading was obtained on the Long Wharf to document the noise created by the unloading of the "Formosa Ten." An initial walk-around noise survey indicated that the noisiest position was proximate to the unloading pumps. The meter was placed on the Long Wharf at a distance of 50 feet from these pumps and a 15-minute measurement was obtained beginning 2:15 p.m. During this time the ships engines were also operational and produced an instantaneous reading of 68 to 69 dBA.

NR-7 – This reading was also obtained on the Long Wharf, this time at a distance of 50 feet from the vapor recovery system. A pump truck was observed to operate at a distance of about 75 feet and its noise added to the measurement. An instantaneous combined noise for the two was obtained at 2:50 p.m. with a reading of 68 dBA Leq. By itself, the vapor recovery system had an instantaneous Leq noise level of approximately 66 dBA.

Mobile Source Noise

Mobile source noise includes that produced from ships operating in the Bay as well as that from worker commutes and service vehicles. With respect to ships, this noise would not be projected to exceed that measured in the field study from the Long Wharf operations and is not readily audible from sensitive onshore locations. However, the existing noise environment must also consider noise produced along project access routes, because the proposed Project contributes a certain amount of traffic which adds to this noise. Therefore, it is necessary to document the existing noise level along the primary access route.

Because traffic noise is preempted from local regulation, it is not subject to the stationary noise source standards presented later in this section in Table 4.7-5 and is typically measured in terms of the CNEL or Ldn noise descriptor. As noted in Section 4.7.2, Regulatory Setting, the City's Noise Ordinance is actually presented in terms of an Ldn standard in that there are no imposed regulations for noise produced between 7:00 and 10:00 p.m. Therefore, traffic noise was determined in terms of the Ldn descriptor. Based on data included in the transportation analysis, Castro Street operates with 7,761 northbound trips and 6,773 southbound trips or a total of 14,534 ADT. The Ldn was then calculated using the following methodology:

- The morning rush hour lasts from 6:00 through 9:00 a.m., and the traffic volume for each hour of this rush hour is equal to 2 hours of standard, non-rush hour daytime traffic;

- The evening rush hour lasts from 4:00 through 7:00 p.m. and, like the morning rush hour, the traffic volume for each hour of this rush hour is also equal to 2 hours of standard, nonrush hour daytime traffic;

- Nighttime traffic is equal to 10 percent of the total ADT traffic and is divided between the hours of 10:00 p.m. through 6:00 a.m; and

- In the calculation of a Ldn value, a 10-dBA penalty is added to the predicted value for nighttime traffic (10:00 p.m. through 7:00 a.m.).

Because the noise associated with this traffic is highly dependent on the number of trucks, vehicle counts were obtained along Castro Street, the project access route, on July 13, 1998, during the field study. Three locations were monitored. These include the area north of the Refinery, the area in front of the Refinery, and the area just north

of I-580 and south of Redwood Way. In each case, 15-minute vehicle counts were obtained. The purpose of these counts was not to determine the total volume of daily traffic, but to establish the ratio of automobiles, medium trucks, and heavy trucks to be used in the FHWA Highway Noise Prediction Model (CALVENO curves). The obtained ratios are presented in Table 4.7-2. (Because of logistics and the inability to obtain representative noise samples, noise monitoring was not performed in these locations.) The average vehicle ratio along with the ADT volume obtained from the City of Richmond was then used in the model. Finally, a speed of 50 mph, as posted, was used to calculate the Ldn noise level.

Table 4.7-2
Obtained Vehicle Counts and Ratios Along Castro Street[1]

Location	Time Measurement Began[2]	Automobiles	Medium Trucks	Heavy Trucks
North of Refinery	11:13 a.m.	192/75.8	10/4.0	51/20.2
North of Redwood Way	11:34 a.m.	172/68.8	25/10.0	53/21.2
Between Redwood Way and I-580	11:54 a.m.	177/81.2	17/7.8	24/11.0
Average		180/75.0	17/7.1	43/17.9

[1] The first value represents the actual count for both north and southbound traffic whereas the second value represents its calculated ratio in percent.
[2] All measurements were 15 minutes in duration.

The model indicates that, based on the noted conditions, traffic on Castro Street produces an Ldn of 71 dBA as measured at a distance of 100 feet from the centerline of the road. Based on hard surface calculations, in the absence of any intervening structures of terrain, the 65 and 60 Ldn noise contours would fall at distances of 398 and 1,259 feet (.24 miles), respectively.

Sensitive Receptors

Residential, as well as some recreational and commercial (e.g., places of worship, libraries, schools, hospitals) land uses, are considered sensitive because they are associated with indoor and/or outdoor human activities that may be subject to speech, hearing, or sleep interference and/or annoyance from noise produced by community sound sources. It then becomes necessary to determine those sensitive land uses that may be subject to undue project-generated noise.

The project is located in the San Francisco Bay southeast of the San Rafael-Richmond Bridge. Ships call on the dock at the end of the Long Wharf about 1 mile from shore, where materials transfers occur. Major equipment associated with loading activities, such the pumps and vapor recovery system, are also mounted toward the outer end of the Long Wharf. The nearest sensitive land uses are the single-family residential units located on shore to the immediate east of the point where the Long Wharf meets the

shoreline. This places them approximately 1 mile from the bulk of Long Wharf operations. Areas to the immediate north and west of the project are owned by Chevron and are used in Refinery operations.

4.7.2 Regulatory Setting

Applicable Laws, Ordinances, Regulations, and Standards

To limit population exposure to physically and/or psychologically damaging, as well as intrusive, noise levels, the Federal government, the State, various county governments, and most municipalities in the State have established standards and ordinances to control noise.

Federal Government

The Federal government regulates occupational noise exposure common in the workplace through the Occupational Health and Safety Administration (OSHA) under the EPA. Noise exposure of this type depends on work conditions and is addressed through a facility's Health and Safety Plan. Any facility (such as the Chevron Long Wharf) or construction effort is subject to a Health and Safety Plan outlining measures to reduce worker exposure to excessive noise. Worker noise exposure is not addressed further in this document.

The U.S. Department of Housing and Urban Development (HUD) has set a goal of 65 dBA Ldn as a desirable maximum exterior standard for residential units developed under HUD funding. (This level is also generally accepted within the State of California.) While HUD does not specify acceptable interior noise levels, standard construction of residential dwellings constructed under Title 24 standards typically provide 20 dBA of attenuation with the windows closed. Based on this premise, the interior Ldn should not exceed 45 dBA.

State of California

The California Department of Health Services' (DHS) Office of Noise Control has studied the correlation of noise levels and their effects on various land uses. As a result, the DHS has established four categories for judging the severity of noise intrusion on specified land uses.

The types of land uses addressed by the DHS and acceptable noise, by category, are presented in Table 4.7-3. Noise in the "normally acceptable" category is generally acceptable with no mitigation necessary. Noise in the "conditionally acceptable" category may require some mitigation as established through a noise study. The "normally unacceptable" category would require substantial mitigation, while the "clearly unacceptable" category is probably not mitigable to a level of less than significant. As noted in Table 4.7-3, there is some overlap between categories.

Contra Costa County

The major objective of the Contra Costa County Noise Element is to provide guidelines to achieve land use compatibility. By identifying noise-sensitive land uses and establishing compatibility guidelines for land use and noise, the Noise Element influences the general distribution, location, and intensity of future land use development. Additionally, the Noise Element identifies various key areas and specific facilities where noise is known to create a nuisance. These include some of the freeways and major arterials (none of which are in the project area), aircraft operations, rail yards (including the one located in Richmond), and some of the various industrial plants and refineries (but not the Chevron facility). Table 4.7-4 shows the County noise standards for exterior noise.

City of Richmond

The Noise Element within City of Richmond's General Plan specifies City goals, policies, guidelines, and methods of implementation. The principal goal of the City is to "Control the level of noise pollution in the community by preventing the development of incompatible land uses, rather than relying entirely on acoustical techniques after the fact, such as sound walls, buffers, etc." To carry out the goal, the Element presents various policies concerning development in noisy areas, as well as methods to limit the transfer of noise from one type of land use to another. In accordance with the City's Noise Element, the City has adopted the State standards presented in Table 4.7-3.

The City of Richmond Noise Ordinance carries forth the goals of the Noise Element and sets noise standards by land use type. These standards are included in Table 4.7-5.

4.7.3 Significance Criteria

Impacts are considered adverse and significant if the project noise levels exceed the local noise ordinances, or any applicable noise regulations promulgated on the State or Federal level. For this analysis, impacts from noise would be considered significant if:

- Applicable local standards, noise elements, or ordinances would be exceeded in noise level, timing, or duration. These include:

  The *Contra Costa County General Plan Noise Element* states that the maximum CNEL for Industrial land uses is 75 dBA.

  The *city of Richmond* noise ordinance's standard for industrial areas limits noise offsite to 70 dBA and for residential areas 60 dBA.

- The project would increase the ambient noise level above ordinance-specified limits by more than 5 dBA (substantial increase), or by 3 dBA in areas already exceeding ordinance-specified limits.

Table 4.7-3
Land Use Compatibility for Community Noise Environment

Land Use Category	Community Noise Exposure – L_{dn} or CNEL (db)						
	50	55	60	65	70	75	80
Residential – Low Density Single Family, Duplex, Mobile Home							
Residential – Multi-Family							
Transient Lodging – Motel, Hotel							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditorium, Concert Hall, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.

Normally Unacceptable: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.

Clearly Unacceptable: New construction or development generally should not be undertaken.

Source: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

Table 4.7-4
Contra Costa County Exterior Noise Standards

Source	Level	Area
Contra Costa County General Plan Noise Element	CNEL = 60 dBA	Low-density residential areas.
	CNEL = 75 dBA	Industrial land uses.

Table 4.7-5
City of Richmond Exterior Noise Standards

Zoning District	Maximum Noise Level Not to be Exceeded More than 30 Minutes in any Hour (dBA)		Maximum Noise Level Not to be Exceeded More than 5 Minutes in any Hour (dBA)
	Measured at Property Line of District Boundary	Measured at Any Boundary of a Residential Zone	Between 10:00 p.m. and 7:00 a.m. Measured at Any Boundary of a Residential Zone[1]
Single-Family Residential	60[2]		
Multifamily Residential	65[2]		
Commercial	70	60	50 or ambient noise level
Light Industrial and Office Flex[3]	70	60	50 or ambient noise level
Heavy Industrial and Marine Industrial	75	65	50 or ambient noise level
Public Facilities and Community Use	65	60	50 or ambient noise level
Open Space and Recreational Districts	65	60	50 or ambient noise level

Source: City of Richmond, Noise Element, 1994.

[1] Restricted hours may be modified through condition of an approved Conditional Use Permit.
[2] The exterior noise limits for any source of noise within any residential zone shall be reduced by 10 dBA between 10:00 p.m. and 7:00 a.m.
[3] For M-1 and M-2 the measurement will be at property lines. For M-3 and M-4 the measurement will be at boundary of the district.

4.7.4 Impacts Analysis and Mitigation Measures

Impact N-1: Stationary Source Noise Consistency with Local Standards, Noise Elements and Ordinances

Because the Long Wharf already exists, it is considered part of the ambient noise environment. It is located in an industrial area, however sensitive receptors are located along the Pt. Richmond shoreline approximately 1 mile away. Over the lease period, no sensitive receptors are to be constructed proximate to the terminal. Occasional noise complaints from residential receptors result in Class I impacts.

The proposed Project is the issuance of a new lease by CSLC allowing Long Wharf operations. Field monitoring indicates that most noise within the project area is from sources other than Long Wharf operations. In terms of the contribution of noise to the environment during Long Wharf operations, the adoption of a new lease for the Chevron Long Wharf would continue the existing operational noise levels for an additional 30 years.

Noise readings obtained in the field study at the nearest residential location present an accurate accounting of the ambient noise, and are highly influenced by noise other than that from Long Wharf operations, most notably the lapping of waves on the beach. In actuality, the field study revealed that even with three ships at dock, noise from Long Wharf operations was, at most, barely audible at the most proximate residential locations. This is demonstrated though the calculation of spreading loss.

Reading NR-6 captured Long Wharf operations with the meter placed at a distance of 50 feet from the loudest point of a ship being unloaded. The L_{50} (i.e., the value that was exceeded 50 percent of the time) was recorded at 70.9 dBA, while the L_{08} measured 71.8 dBA. Noise from the vapor recovery system had an Leq of about 68 dBA. (Note that for a fairly continuous noise source, the Leq is very close to the L_{50}.) Based on logarithmic addition, every time the number of ships is doubled, the sound is increased by 3 dBA. Therefore, if 2 ships were to unload simultaneously in the same location, the projected L_{50} would be 73.9 dBA, while 4 ships would produce an L_{50} of 76.9 dBA. Similarly, 2 ships would produce an L_{08} of 74.8 dBA, while 4 ships would raise this value to 77.8 dBA. The vapor recovery system would add about 0.2 dBA to each of these values. Therefore, the 3 ships noted at the dock during the noise measurement are expected to produce an L_{50} of about 75.7 dBA and an L_{08} of 76.6 dBA, both as measured at a distance of 50 feet.

A reasonable worst-case scenario (4 ships with the vapor recovery system) would be expected to produce an L_{50} of about 77 dBA and an L_{08} of about 78 dBA as measured at a distance of 50 feet.

The L_{50} and L_{08} values would be 36.5 and 37.5 dBA, respectively, as measured at the nearest residence, approximately 1 mile away. These levels are well below the 65 dBA daytime standard and the 50 dBA nighttime standard and are a less than significant (Class III) impact. It is noted, that on a calm, quiet night with still waters, this noise would be audible; however, it would not exceed the City's noise standards.

Local residents have, on occasion, complained of noise created by some of the ships that call on the Long Wharf. Discussion with Chevron personnel revealed that this noise could be due to the operation of onboard generators. Chevron also stated that these are ships are owned and operated by foreign entities and Chevron has no control over their internal operations. Furthermore, it was noted that due to power incompatibilities and the required amount of power necessary to sustain internal operations, "shore power" was not an option to these generators. Without actual data on these noise levels, based on the complaints of the residents, it was concluded that these operations result in an adverse, significant (Class I) impact.

Mitigation Measures for N-1:

N-1. As a lease condition, Chevron shall either retain an on-call noise consultant or train onsite personnel in the proper use of sound monitoring equipment. When a vessel berths at the Long Wharf that is perceived to have a noise problem, either by Chevron personnel or public notification (resulting from a history of local resident noise complaints), noise measurements shall be obtained to document the noise associated with these ships. If these ships are found to emit noise at a level that exceeds City standards at the residential property line, the vessels' operators shall be notified to determine if the problem can be corrected. If the owner/operator cannot or will not correct the problem, the following shall be implemented:

- Chevron shall berth these ships during all subsequent visits at the most distant berth from local receptors that can accept the class of ship and cargo; and

- During subsequent visits, these "noisy" ships shall not be allowed to hotel at the Long Wharf during the night beyond the time necessary to load/unload.

Rationale for Mitigation: In actuality, this is a preempted noise source exempt from City regulation. However, for the purposes of this analysis, as a reasonable worst-case scenario, this noise has been linked with Long Wharf operations and subject to CEQA review. Chevron personnel recognize the problem, but because the ships are neither owned nor operated by them, they have no power to control these noise emissions. It would be neither practical nor desirable to the residents to line the beach with a sound wall to reduce the impact of this infrequent noise source. However, Chevron shall determine if the noise associated with these ships exceeds ordinance levels and work with the ship operators to reduce or avoid noise issues.

Residual Impacts: The inclusion of these measures could reduce the significance of the impact, however, the impact could remain significant.

Impact N-2: Mobile Source Noise

No expansion of Long Wharf operations are expected to occur over the 30-year lease period. Mobile sources of noise associated with future vessel berthing operations are expected to remain similar to current operations. Impacts are adverse, but less than significant (Class III).

Mobile source noise includes that produced from ships operating in the Bay as well as that from worker commutes and service vehicles.

With respect to ships, this noise is not projected to exceed that produced from Long Wharf operations, and as these ships move farther from local residents, their noise is further attenuated. Furthermore, this noise is commonplace in the Bay and is neither unusual nor obtrusive. As such, this is considered as an adverse, but less than significant (Class III) impact.

The operation of Long Wharf-related on road vehicles also adds to the ambient noise levels on access routes. Because noise generated along Castro Street may already exceed the City's goals, impacts would be significant if the project contributes a volume of vehicles that would raise the ambient noise level by the criterion level of 3 dBA Ldn. (In actuality, the determination as to whether noise generated along this roadway exceeds the City's goals depends on the locations of any sensitive land uses, as well as their distances from the centerline of the road, and the presence of intervening structures. However, as a reasonable worst-case scenario, the 3 dBA criterion was used.)

The Applicant notes that as many as 60 trucks call on the Long Wharf daily. While many of these are, in all probability, internal trips between the Refinery and the Long Wharf and never occur on the streets, a reasonable worst-case scenario assumed that these vehicles enter and exit the site and the Refinery, producing 120 trips per day. The Applicant also notes that Long Wharf operations require a minimum of 21 personnel. This analysis assumed that on average 25 personnel are used and these workers produce 50 trips per day. These vehicles are then added to the existing network of roadways, most notably Castro Street. Once on Castro Street, this traffic is divided up as these vehicles proceed in various directions with further reductions in their associated noise.

To determine the project's contribution to this noise level, the 50 automobile and 120 truck trips assigned to Long Wharf operations were subtracted from the ADT and the new ADT and revised vehicle ratio were modeled. The Ldn was remodeled. All other parameters remain unchanged. Based on these revised volumes, the model continues to predict a 71 dBA Ldn noise level as measured at a distance of 100 feet from the centerline of the road, and the distances to both the 65 and 60 Ldn noise levels remains unchanged. Therefore, the project adds less than 1 dBA to the ambient noise, resulting in an adverse, but less than significant (Class III) impact. Model runs are included in Appendix D.

N-2: No mitigation is required.

4.7.5 Impacts of Alternatives

Impact N-3: No Project Alternative

With no new lease, noise associated with the Long Wharf would cease, resulting in a beneficial impact (Class IV). Decommissioning of the Long Wharf would be subject to short term construction noise impacts that would be less than significant (Class III).

Under the No Project Alternative, Chevron's lease would not be renewed and the existing Long Wharf would be subsequently decommissioned with its components abandoned in place, removed, or a combination thereof. The decommissioning of the Long Wharf would follow an Abandonment and Restoration Plan as described in Section 3.3.1, No Project Alternative.

Under the No Project Alternative, alternative means of crude oil / product transportation would need to be in place prior to decommissioning of the Long Wharf, or the operation of the Chevron Refinery would cease production, at least temporarily. It is more likely, however, that under the No Project Alternative, Chevron would pursue alternative means of traditional crude oil transportation, such as a pipeline transportation, or use of a different marine terminal. Accordingly, this EIR describes and analyzes the potential environmental impacts of these alternatives. For the purposes of this EIR, it has been assumed that the No Project Alternative would result in a decommissioning schedule that would consider implementation of one of the described transportation alternatives. Any future crude oil or product transportation alternative would be the subject of a subsequent application to the CSLC and other agencies having jurisdiction, depending on the proposed alternative.

Decommissioning would be assumed to be accomplished primarily via the water with materials taken away via barge, other than those that can be used at the Refinery. The activity would be subject to the local noise ordinance that would restrict construction to allowed hours. The activity would also be subject to a separate CEQA review. Impacts would be adverse, but less than significant (Class III).

With no new lease, noise as described for the proposed Project would cease, resulting in a beneficial impact (Class IV). Similar noise impacts would occur at another marine terminal. The severity of noise impact would depend on the distance to any sensitive noise receptors and other ambient noise sources

N-3: No mitigation is required.

Impact N-4: Full Throughput via Pipeline Alternative

To operate at its current capacity, Chevron would need to purchase crude oil from a number of sources. Pipeline delivery would be augmented with foreign crude piped over from other Bay Area terminals. Several of these pipelines are currently operating near capacity. Thus, new pipelines and booster stations would have to be constructed to make up any shortfall. Pipeline construction has the potential to result in significant adverse (Class II) impacts. Any sensitive receptors within 280 feet of the operating booster station(s) may be subject to a significant (Class II) impacts.

Construction Noise Impacts

Pipeline and booster station construction would require the use of heavy equipment that would produce construction noise. Two types of noise impacts could occur during the construction phase. First, the transport of workers, equipment, and materials to the construction site would incrementally increase noise levels along site access roadways. Although there could be a relatively high single event noise exposure potential with passing trucks, the increase in noise is relatively minor when averaged over a 24-hour period and any increase would be less than 1 dBA and would be inaudible.

With respect to heavy equipment operations, noise disturbances in the areas adjacent to pipeline and booster station construction may be expected during construction. As with most construction projects, construction would require the use of a number of pieces of heavy equipment, such as bulldozers, backhoes, loaders, and cranes. Composite construction noise is best characterized by Bolt, Beranek, and Newman (EPA 1971). In this study construction noise for commercial and industrial development is presented as 89 dBA Leq as measured at a distance of 50 feet from the construction effort. This value takes into account both the number of pieces and spacing of the heavy equipment. As a reasonable worst-case scenario, the 89 dBA value was used for construction for this alternative.

The operation of such equipment would result in both steady and episodic noise which would add to the ambient levels currently experienced along any proposed routes. The noise produced from construction decreases at a rate of approximately 6 dBA per doubling of distance. Therefore, at 100 feet, the noise levels would be about 6 dBA less or 83 dBA. Similarly, at 200 feet, the noise levels would be 12 dBA less or 77 dBA, and it would take a distance of approximately 1,400 feet to reduce this noise level down to a generally acceptable level of 60 dBA. Therefore, any sensitive receptors that may lie within 1,400 feet of pipeline construction would be subject to a significant (Class II) impact for the duration of construction.

Operations Noise Impacts

Material traveling through a buried pipeline does not emit audible noise above the surface and any potential impact would be from the operation of the booster station(s). Noise generated from these stations would vary with the type of equipment that would be used. Crude oil pumps can be powered by electric motors, diesel or natural gas reciprocating engines, or gas turbines. Along with the type of motor used, its horsepower rating also contributes to the noise level. The noise level can also vary with the design and number of the pumps that move the fluid through the pipe. Perceived noise also varies with the design and materials used in the construction of the facility's enclosure, as well as the distance to any sensitive areas. It was assumed that the motor and pumps produce a combined noise level similar to that produced by a typical piece of heavy construction equipment (i.e., 85 dBA) and the enclosure affords an attenuation similar to that for a residential structure (i.e., 20 dBA). With these assumptions, a noise level of about 65 dBA is expected at a distance of 50 feet from the

structure. A 60-dBA level would then fall at a distance of about 90 feet. A 50-dBA level (as dictated for night operations) would occur at a distance of about 280 feet. Therefore, any sensitive receptors within 280 feet of the booster station may be subject to a significant (Class II) impact.

Mitigation Measures for N-4:

N-4a. The following measures shall be implemented for construction:

- Any pipeline construction performed within 250 feet of any single-family residential areas, 140 feet of any multifamily residential areas, or 80 feet of any commercial or industrial areas shall be limited to weekdays between 7:00 a.m. through 7:00 p.m;

- Any pipeline construction performed between 1,410 (.27 miles) through 250 feet of any single-family residential areas, between 790 through 140 feet of any multifamily residential areas, or between 445 through 80 feet of any commercial or industrial areas shall be limited to weekdays between 7:00 a.m. through 7:00 p.m. and weekends and holidays between 9:00 a.m. and 8:00 p.m;

- Any pumping station construction or construction that will occur in one area in excess of 15 days performed within 1,410 feet (.27 miles) of any single-family residential areas, 790 feet of any multifamily residential areas, or 445 feet of any commercial or industrial areas shall be limited to weekdays between 7:00 a.m. through 7:00 p.m; and

- Any pumping station construction or construction that will occur in one area in excess of 15 days performed between 2,500 (.47 miles) and 1,410 feet (.27 miles) of any single-family residential areas, between 1,410 (.27 miles) and 790 feet of any multifamily residential areas, or between 780 and 445 feet of any commercial or industrial areas shall be limited to weekdays between 7:00 a.m. through 7:00 p.m. and weekends and holidays between 9:00 a.m. through 8:00 p.m.

N-4b. For operations, any booster stations within 280 feet of residential receptors should be further evaluated for noise and mitigated by insulating the station with noise buffering materials.

Rationale for Mitigation: Adherence to the local noise ordinances will apply to construction and will reduce impacts to less than significant. In addition, the mitigation measures are designed to minimize and control construction noise levels in areas of sensitive receptors. They are designed to allow construction work to proceed, while respecting the rights of sensitive receptors during the night and on weekends. For

operations, if noise from booster stations would result in levels above set noise criteria, then provision of insulating materials within the booster station would serve to mitigate the noise to a less than significant level.

Impact N-5: Conceptual Consolidation Terminal Alternative

With the Conceptual Consolidation Alternative, a new marine terminal would be constructed north of the Long Wharf. This new terminal would handle half of the quantity of materials that are now handled by the Chevron Terminal, in addition to providing material to other local refineries. The other half would still be handled by the Long Wharf. Construction of pipelines would have the potential to result in significant (Class II) impacts.

Construction Noise Impacts

Short-term emissions associated with the construction of a new terminal could be approximately 89 dBA as measured at a distance of 50 feet and, as with pipeline construction, the 60-dBA noise level would occur at a distance of about 1,400 feet. In all probability, no sensitive land uses would be within this distance and any impact would be less than significant (Class III). In addition, a pipeline would need to be constructed to transport petroleum liquids from the new terminal to the Refinery, and this construction would produce a similar noise level. Depending on the chosen route, based on a worst-case scenario, construction could occur within 1,400 feet of sensitive land uses, producing a significant, adverse (Class II) impact for the duration of construction.

Operations Noise Impacts

Assuming that partial consolidation of operations of the new marine terminal resulted in a 50 percent decrease in Long Wharf operations, noise from Long Wharf operations could decrease by as much as 3 dBA. Except in the noted instance of the generators, any decrease in noise would not be noticeable to the local residents. Noise produced at the new consolidation terminal is expected to be similar to that at the existing Long Wharf, and any impact would be based on the location of the noise and its proximity to sensitive land uses. This would be the subject of a separate CEQA document, but it is expected that any potential impacts could be reduced to a less than significant (Class III) level.

Because any necessary pipelines would be buried and would not emit audible noise, and no offsite booster stations should be required because of the relatively short pipeline runs, no other noise impacts (other than those noted) are expected with this alternative.

Mitigation Measures for N-5:

N-5. Implement MM N-4.

Rationale for Mitigation: Adherence to the local noise ordinances will apply to construction and will reduce impacts to less than significant. Also the mitigation measures in MM N-4 are designed to minimize and control construction noise levels in

areas of sensitive receptors. They are designed to allow construction work to proceed, while respecting the rights of sensitive receptors during the night and on weekends. Impacts would be reduced to less than significant.

4.7.6 Cumulative Projects Impacts Analysis

Impact CUM-N-1: Cumulative Noise

Cumulative projects in the region comprise the ambient noise environment throughout the Bay area. Chevron Long Wharf continued operations would result in less than significant (Class III) noise impacts to the cumulative environment.

Unless two projects occur in proximity, their noise is not additive. All projects identified as being cumulative are located at distances such that their noise does not manifest itself in any sensitive areas, and were not included in field study baseline measurement. As such, cumulative noise would result in a less than significant (Class III) impact.

CUM-N-1: No mitigation is required.

Table 4.7-6 summarizes Noise impacts and mitigation measures.

Table 4.7-6
Summary of Noise Impacts and Mitigation Measures

Impacts	Mitigation Measures
N-1: Stationary Source Noise Consistency with Local Standards, Noise Elements and Ordinances	**N-1:** Chevron shall either retain an on-call noise consultant or train onsite personnel in the proper use of sound monitoring equipment. Chevron shall work with vessel operators to reduce or avoid noise sources.
N-2: Mobile Source Noise	**N-2:** No mitigation required.
N-3: No Project Alternative	**N-3:** No mitigation required.
N-4: Full Throughput via Pipeline Alternative	**N-4a:** Pipeline construction shall be limited by appropriate noise ordinance. **N-4b:** Booster stations within 280 ft. of residential receptors will be evaluated and mitigated.
N-5: Conceptual Consolidation Terminal	**N-5:** Implement MM N-4.
CUM-N-1: Cumulative Noise	**CUM-N-1:** No mitigation required.

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